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Peterson

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(54) **DUAL WHEEL TRENCH COMPACTOR**

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(52) **U.S. Cl.** **404/127**; 404/122; 37/142.5
(58) **Field of Search** 404/91, 103, 122, 404/127, 128, 133.05; 405/271, 179; 37/142.5

(56) **References Cited**

U.S. PATENT DOCUMENTS

D. 305,337		1/1990	Plummer	D15/28
975,457	*	11/1910	Ransome	37/142.5
2,891,335	*	6/1959	Linneman	37/146
3,283,841	*	11/1966	Davis	180/14
3,471,953	*	10/1969	Wyatt	37/142.5
3,908,292		9/1975	Harris	37/142.5
3,961,856	*	6/1976	Degenhart	404/133
4,127,351	*	11/1978	Vural	404/72
4,539,765		9/1985	Reece	37/142.5
4,579,071		4/1986	Johnson	111/85
4,723,870		2/1988	Martinez	404/121
4,782,606		11/1988	Surface	37/117.5
4,911,248	*	3/1990	Schrepfer	172/464
4,913,581		4/1990	Weiler	404/117
5,088,855	*	2/1992	Giliberti	404/103
5,114,269	*	5/1992	Shepherd	404/122
5,499,685	*	3/1996	Downing, Jr.	172/699
5,526,590	*	6/1996	Palm et al.	37/142.5

* cited by examiner

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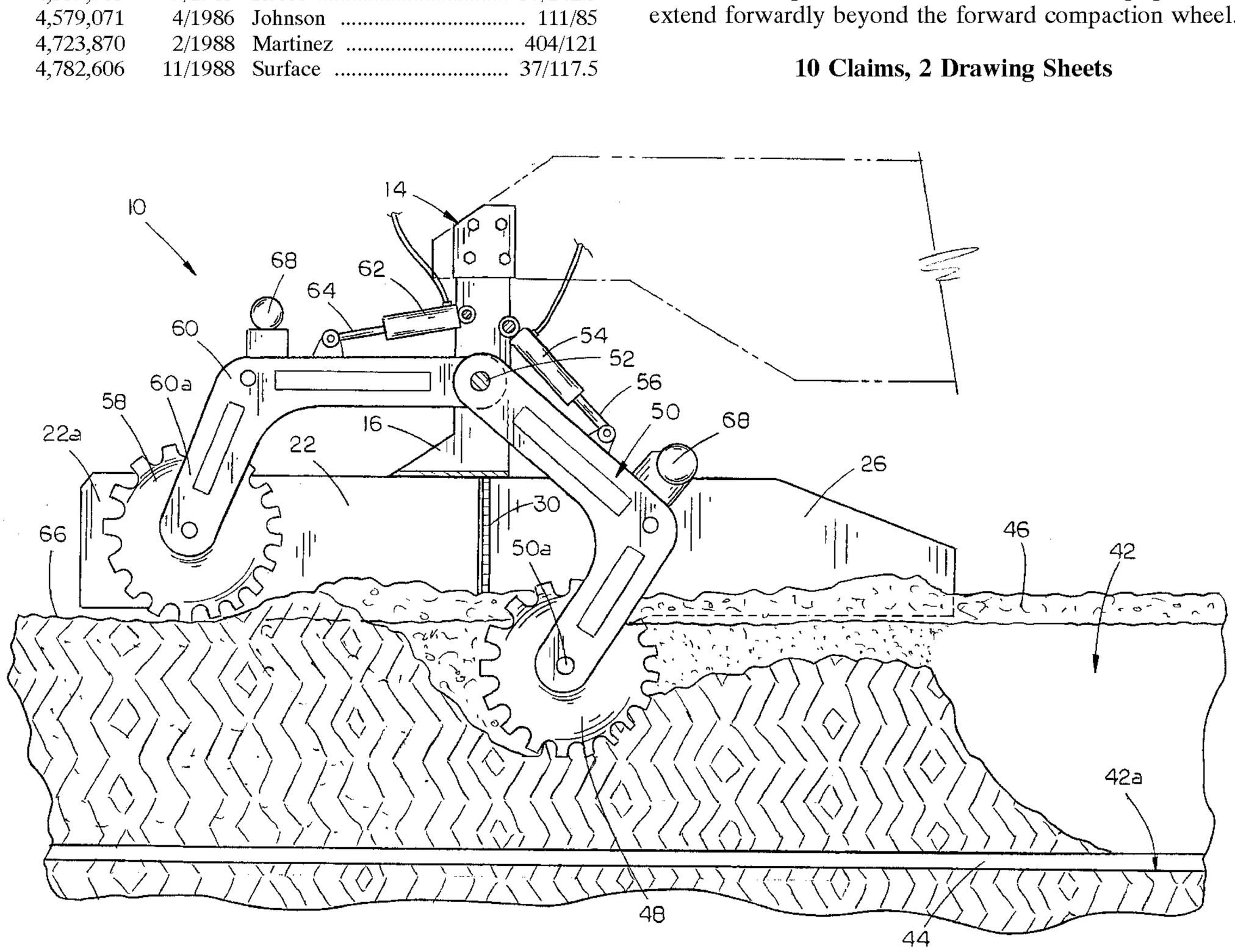
(57) **ABSTRACT**

A compactor including a forward and rearward compaction wheel each rotatably supported on a support arm and pivotally connected to a main frame. The forward compaction wheel is pivoted to a position aligned forwardly of and positioned below the rearward compaction wheel when in an operating position. A pair of diverter panels are connected to the frame and extend longitudinally on opposing sides of the rearward compactor wheel to divert fill dirt towards the compactor wheels. Each diverter panel has a diverter wing pivotally connected thereto with the diverter wings diverging outwardly and forwardly. The diverter wings are pivotally connected at a point of the forward compaction wheel and proximal thereto. The diverter panels are preferably parallel to one another and extend rearwardly beyond the rearward compaction wheel. The diverter wings preferably extend forwardly beyond the forward compaction wheel.

10 Claims, 2 Drawing Sheets



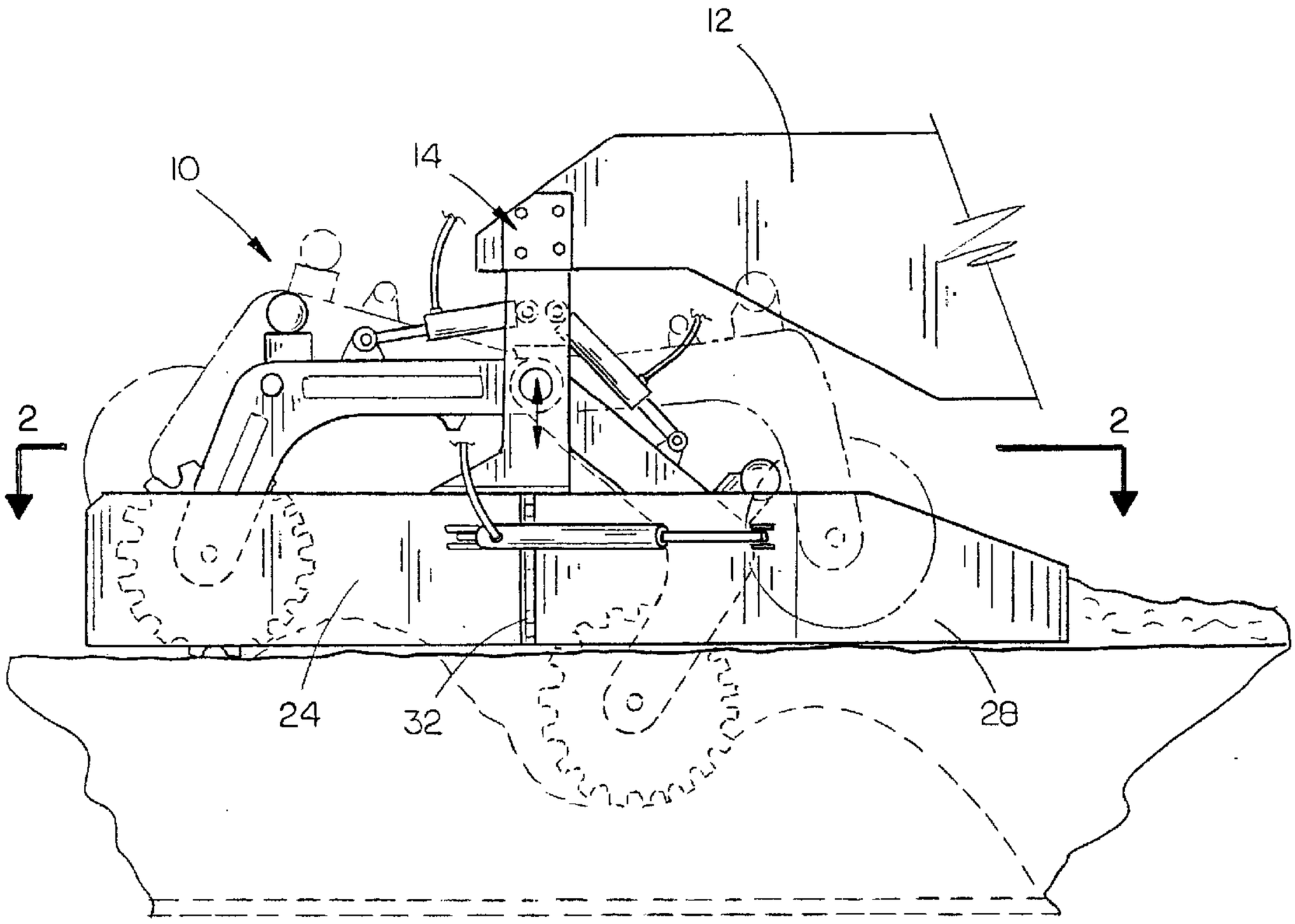

12
14
10
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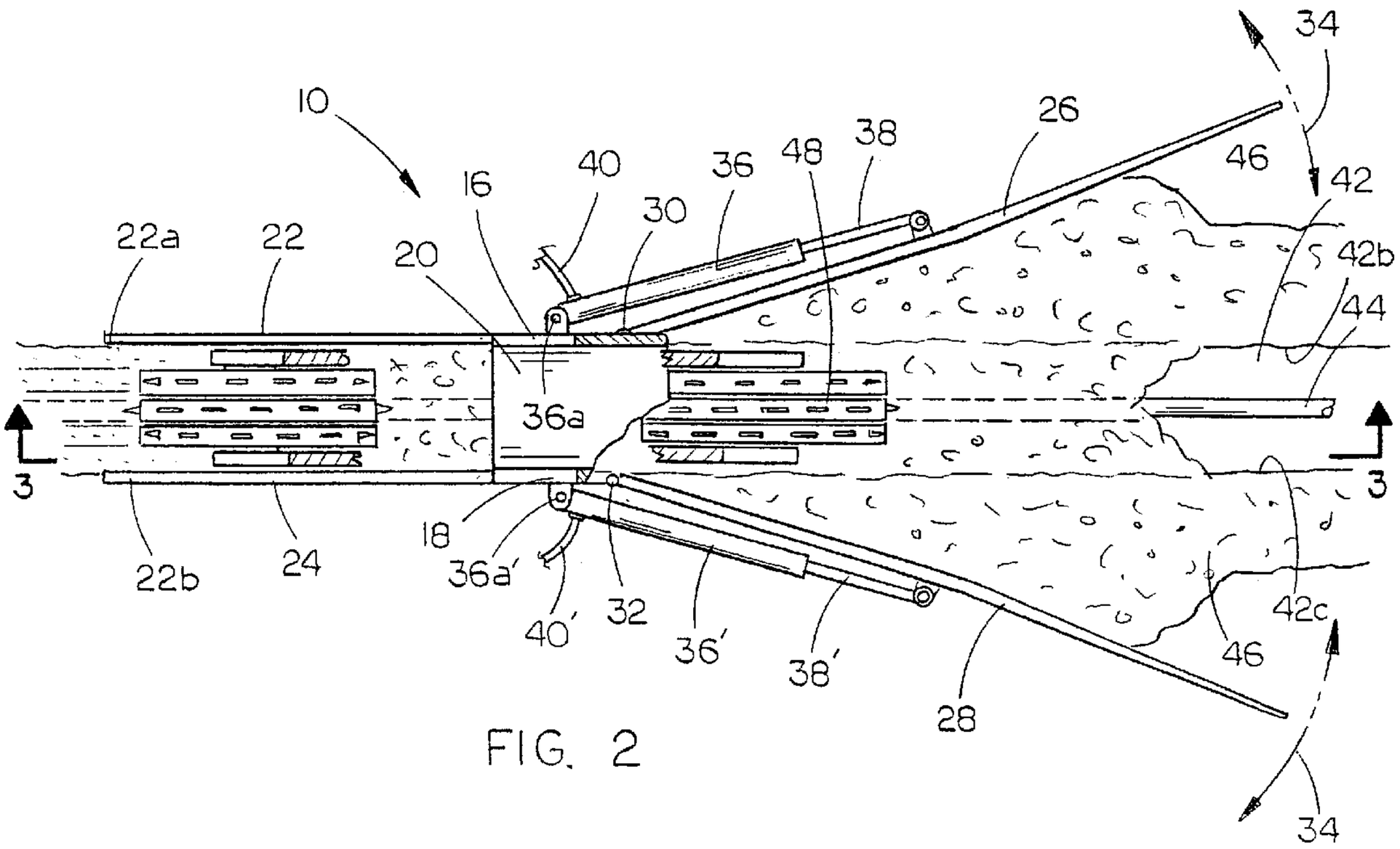
FIG. 1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22a
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42b
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36a'
22b
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40'
36'
38'
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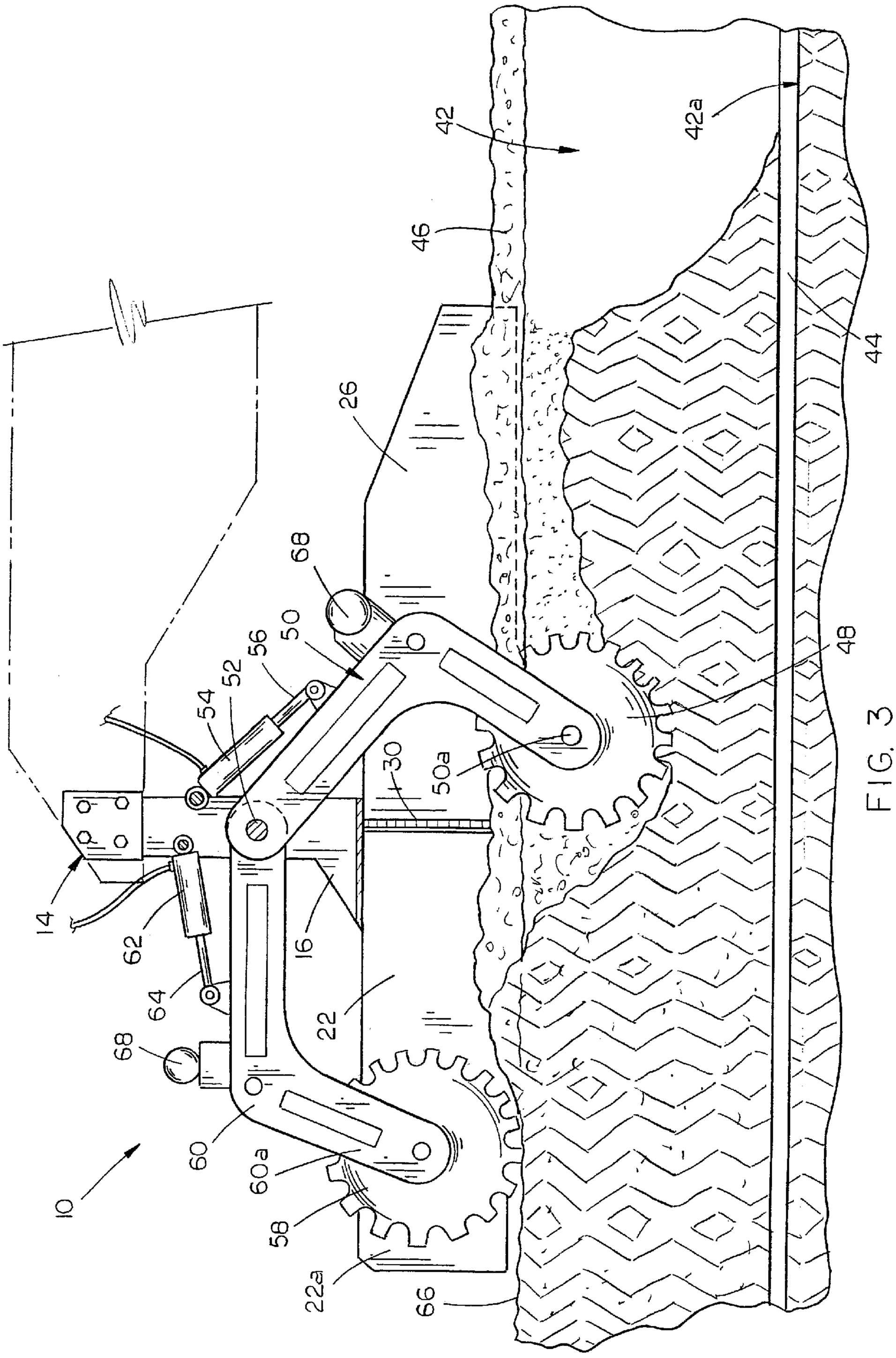
42c
46
34

FIG. 2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60a
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22a
66

FIG. 3

DUAL WHEEL TRENCH COMPACTOR

TECHNICAL FIELD

The present invention relates generally to soil compactors, and more particularly to an improved soil compactor especially suited for narrow and deep trenches.

BACKGROUND OF THE INVENTION

The installation of fiber-optic cable has become quite common in both residential districts and rural areas. The typical installation utilizes a trencher apparatus to form a trench in excess of four feet deep and approximately six inches in width, while fiber optic cable is dispensed behind the trencher at the bottom of the trench.

The main problem with conventional installations of cable in the bottom of this narrow, deep trench is the replacement of soil in the trench. Typically, the soil piled to the sides of the trench will be pushed into the trench with a backhoe or the like. If this backfilled earth is not compacted sufficiently, a mound of soil will remain over the trench or the soil will later settle and form a depression along the line of the underground installation. Such a depression causes water to stand along the trench and can thereby increase the possibility of damage to the cable at the bottom of the trench as well as vehicles travelling along the trench. Further, people and animals may be injured if they come into contact with the depression.

One method for compacting the soil within the trench utilizes a compacting roller centrally supported on the bucket or scoop of a loader machine. In use, the machine straddles the trench and the roller is moved fore and aft within the trench to compact the soil. The roller at the front end of the loader, and the manipulation of the loader weight on the roller, makes it difficult to steer the machine and follow the trench line and requires large amounts of time to conduct the fore and aft movement of the roller which, in turn, results in poor compaction of the trench.

SUMMARY OF THE INVENTION

It is therefore a general object of the present invention to provide an improved compactor for trenches and especially narrow and deep trenches.

Another object of the present invention is to provide a dual wheel compactor for compacting backfill dirt within a trench at two different levels to provide a uniform compacting from the trench bottom to the ground level.

Still another object is to provide a dual wheel compactor with vertically adjustable compactor wheels for the compaction of trenches of various depths.

Still a further object of the present invention is to provide a dual wheel compactor which will compact dirt to the finished grade level on a single pass along the trench.

Yet another object of the invention is to provide a dual wheel compactor which is adapted to be used on large or small trenching machines.

Yet another object is to provide a dual wheel compactor which is simple to operate and economical to manufacture.

These and other objects of the present invention will be apparent to those skilled in the art.

The compactor of the present invention includes a forward and rearward compaction wheel each rotatably supported on a support arm and pivotally connected to a main frame. The forward compaction wheel is pivoted to a position aligned forwardly of and positioned below the rearward compaction wheel when in an operating position. A pair of diverter panels are connected to the frame and extend longitudinally on opposing sides of the rearward compactor wheel to divert fill dirt towards the compactor wheel. Each diverter panel has a diverter wing pivotally connected thereto with the diverter wings diverging outwardly from one another. The diverter wings are pivotally connected at a point rearwardly of the forward compaction wheel and proximal thereto. The diverter panels are preferably parallel to one another and extend rearwardly beyond the rearward compaction wheel. The diverter wings preferably extend forwardly beyond the forward compaction wheel.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevational view of the compactor of the present invention;

FIG. **2** is a sectional view taken at lines **2—2** in FIG. **1**, looking down at the trench being filled using the compactor of the present invention; and

FIG. **3** is a sectional view taken at lines **3—3** in FIG. **2**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, in which similar or corresponding parts are identified with the same reference numeral, and more particularly to FIG. **1**, the dual wheel compactor of the present invention is designated generally at **10** and is shown mounted on a support arm **12** extending from a tractor or other towing vehicle (not shown). Preferably, support arm **12** is of a type which may be raised and lowered so as to raise compactor **10** off the ground for transport to various locations.

A frame **14** is mounted to the rearward end of support arm **12** and includes a pair of spaced-apart vertical side members **16** and **18**, respectively, connected at their lower ends by a horizontal plate **20**. A pair of dirt diverter panels **22** and **24** depend from plate **20** and extend rearwardly therefrom. Diverter panels **22** and **24** are vertically oriented and preferably parallel to one another. A pair of dirt diverter wings **26** and **28** are pivotally connected to the forward ends of diverter panels **22** and **24**, respectively, at hinges **30** and **32**, respectively. Hinges **30** and **32** are oriented vertically to permit pivotal movement of diverter wings **26** and **28**, as shown by arrows **34**, to increase or decrease the angle of divergence between diverter wings **26** and **28**.

A hydraulic cylinder **36** is pivotally connected at a rearward end **36***a* to diverter panel **22** and has its cylinder rod **38** pivotally connected to diverter wing **26**. A hydraulic hose **40** is operably connected to cylinder **36** to extend and retract rod arm **38** and thereby selectively pivot diverter wing **26** as shown by arrow **34**. A similar cylinder **36'** is pivotally connected at a rearward end **36***a'* between diverter panel **24** and diverter wing **28** such that hydraulic pressure provided by hydraulic hose **40'** extends and retracts cylinder rod **38'** to pivot diverter wing **28**.

Referring now to FIGS. **2** and **3**, a deep, narrow trench **42** has been cut by a conventional trencher and a cable **44** is shown laid on the bottom **42***a* of the trench. Fill dirt **46** which has been removed from trench **42** during the trenching operation is filed along both sides of the trench.

A forward compactor wheel **48** is rotatably mounted on the lower end **50***a* of an L-shaped support arm **50**. The upper end of support arm **50** is pivotally mounted to a main axle **52** extending horizontally between side members **16** and **18**.

Axle **52** is oriented perpendicularly to the longitudinal axis of diverter panels **22** and **24** with support arm **50** and forward compactor wheel **48** vertically movable between diverter wings **26** and **28** by the pivoting action of support arm **50**. A cylinder **54** is pivotally connected at a rearward end to frame **14** above axle **52**. The cylinder rod **56** of cylinder **54** is pivotally connected to support arm **50** forwardly of axle **52**, such that extension or retraction of cylinder **54** will cause support arm **50** to selectively raise and lower compactor wheel **48**.

A rearward compactor wheel **58** is rotatably mounted on the lower end **60***a* of a second L-shaped support arm **60**. The forward end of support arm **60** is pivotally mounted to axle **52** to permit rearward compactor wheel **58** to be selectively raised and lowered between diverter panels **22** and **24**. A cylinder **62** is pivotally connected at a forward end to frame **14** at a point above axle **52**. Cylinder rod **64** of cylinder **62** is pivotally connected to support arm **60** rearwardly of axle **52**. Actuation of cylinder **62** to extend or retract extensible arm **64** thereby selectively raises and lowers rearward compactor wheel **58**.

A conventional vibrator motor **68** is rigidly mounted to each of support arms **50** and **60** such that operation of vibrators **68** will vibrate arms **50** and **60** and thereby vibrate compactor wheels **48** and **58** to enhance the compaction capabilities thereof.

In operation, compactor **10** may be towed directly behind the cable laying machine or towed behind a separate vehicle. As shown in FIG. **2**, compactor **10** is aligned over trench **42** with diverter panels **22** and **24** generally aligned with the side walls **42***b* and **42***c* of trench **42**. Diverter wings **26** and **28** are then pivoted to the desired divergent angle so as to divert the mounds of fill dirt **46** on each side of trench **42** gradually towards the trench as the compactor is moved forwardly.

As shown in FIGS. **2** and **3**, forward compactor wheel **48** is mounted on compactor **10** forwardly of the rearward ends of diverter wings **26** and **28** such that fill dirt **46** continues to be diverted into the trench on top of and rearwardly of forward compactor wheel **48**.

The desired vertical height of forward compactor wheel **48** above the trench bottom **42***a* may be selectively adjusted by actuating cylinder **54** to pivot forward support arm **50**. For a conventional trench approximately fifty-two inches deep, forward compactor wheel **48** is preferably located approximately thirty-six inches below the finish grade line **66**, or approximately half the distance from the bottom of trench **42**.

The rearward compactor wheel is mounted on rearward support arm **60** and located between the rearward ends **22***a* and **22***b* of diverter panels **22** and **24**. Cylinder **62** is actuated so as to locate rearward compactor wheel **58** with the lowermost compacting surface located at the finish grade line **66**. As compactor **10** is moved forwardly, diverter wings **26** and **28** will force a portion of fill dirt **46** into trench **42** forwardly of forward compactor wheel **48**. Forward compactor wheel **48** will compact the loose fill dirt in the lower half of trench **42**. Because of the location of forward compactor wheel **48**, the rearward ends of diverter wings **26** and **28**, and diverter panels **22** and **24**, will force the remaining fill dirt **46** on top of and rearwardly of forward compactor wheel **48**, in front of rearward compactor wheel **58**. The operation of vibrator **68** enhances the compaction capabilities of compactor wheels **48** and **58** to leave a completely filled-in and compacted trench with a surface at the desired finish grade line **66**.

Whereas the invention has been shown and described in connection with the preferred embodiment thereof, many modifications, substitutions and additions may be made which are within the intended broad scope of the appended claims.

I claim:

1. A compactor for filling a trench with fill dirt and compacting the fill dirt in the trench to a finish grade line, comprising:

a main frame;

a forward support arm having first and second ends;

a forward compactor wheel rotatably mounted to said first end of said forward support arm;

said second end of said forward support arm being directly secured to said main frame;

a rearward support arm having first and second ends;

a rearward compactor wheel rotatably mounted to said first end of said rearward support arm;

said second end of said rearward support arm being directly connected to said main frame;

said rearward compactor wheel positioned rearwardly and vertically above said forward compactor wheel and being longitudinally aligned therewith;

said forward and rearward compactor wheels having parallel rotational axes;

upstanding first and second horizontally spaced-apart diverter panels connected to said main frame positioned on lateral sides of said rearward compactor wheel;

said first and second diverter panels having rearward and forward ends;

upstanding first and second diverter wings having rearward and forward ends;

said rearward ends of said first and second diverter wings being secured to said first and second diverter panels adjacent the forwards ends thereof, respectively;

said first and second diverter wings extending forwardly and outwardly from the rearward ends thereof to divert fill dirt laterally towards said compactor wheel;

said forward ends of said first and second diverter wings being positioned forwardly of said forward compactor wheels.

2. The compactor of claim **1** wherein said forward support arm is pivotally connected to said main frame about a generally horizontal axis parallel to the rotational axis of said forward compaction wheel, for pivotal movement within a vertical plane, and further comprising means connected between said forward support arm and said main frame for selectively pivoting said forward support arm to selectively raise and lower said forward compaction wheel.

3. The compactor of claim **2** wherein said rearward support arm is pivotally connected to said main frame about a generally horizontal axis parallel to the rotational axis of said rearward compaction wheel, for pivotal movement within a vertical plane, and further comprising means connected between said rearward support arm and said frame for selectively pivoting said rearward support arm to selectively raise and lower said rearward compaction wheel.

4. The compactor of claim **1**, wherein said rearward support arm is pivotally connected to said main frame about a generally horizontal axis parallel to the rotational axis of said rearward compaction wheel, for pivotal movement within a vertical plane, and further comprising means connected between said rearward support arm and said main frame for selectively pivoting said rearward support arm to selectively raise and lower said rearward compaction wheel.

5. The compactor of claim **1** wherein said forward support arm is pivotally connected to said main frame about a generally horizontal axis parallel to the rotational axis of said forward compaction wheel, for pivotal movement within a vertical plane, and further comprising means connected between said forward support arm and said frame for selectively pivoting said forward support arm to selectively raise and lower said forward compaction wheel.

6. The compactor of claim **1**, further comprising means connected to said forward and rearward compaction wheels for vibrating said forward and rearward compaction wheels.

7. The compactor of claim **1** wherein said first and second diverter wings are selectively pivotally secured about vertical axes to said first and second diverter panels.

8. The compactor of claim **1** wherein first and second hydraulic cylinders are pivotally secured to said first and second diverter wings respectively for pivoting the same with respect to said first and second diverter panels respectively.

9. The compactor of claim **1** wherein said rearward ends of said diverter panels are positioned rearwardly of said rearward compactor wheel.

10. The compactor of claim wherein said first and second diverter panels are substantially vertically disposed and are generally parallel with respect to one another.

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